Please Note: Many additional NCEP model forecast graphics (in addition to what is included here) are available at the DYNAMO data catalog and span from hourly to Week-2.

Work supported by NOAA’s Climate Program Office

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Review of Conditions During the Past Week
Summary of Recent Conditions

The MJO remained active during the past week with the enhanced phase now centered across the eastern Indian Ocean (IO). Atmospheric Kelvin wave (KW) activity continues to be superimposed on the more slowly evolving MJO envelope with the enhanced phase of a strong KW crossing the IO during the past week. Equatorial Rossby wave (ERW) activity is currently present across the Maritime continent (MC) and western Pacific (WPAC) and shifting westward.

Weekly averaged OLR anomalies show enhanced convection was observed for parts of east Africa, much of the equatorial IO, the Arabian Sea and southern India. Near to below average convection was observed over the MC and the WPAC during the past week. Easterly low-level wind anomalies continued across the eastern IO and southerly Bay of Bengal stretching into the WPAC while westerly anomalies have entered the equatorial western and central IO.

The WH MJO index indicated an increase in amplitude and eastward propagation during the past week with the enhanced phase shifting to Phase 3. Model forecasts of the MJO index from last week predicted this evolution well, although the models had lower amplitude as compared to what was observed. Forecasts from two weeks ago were too slow with the eastward propagation of the MJO signal into the IO. The DYNAMO outlook from last week verified well for enhanced convection from parts of east Africa across much of the equatorial IO, although the southern extent of the forecast enhanced rainfall was too far south. Areas of suppressed convection were observed across the MC and western Pacific in some areas, but positive anomalies were generally small. The outlook from two weeks was good for indicating enhanced convection over the western and central IO including the DYNAMO array.
Weekly Spatial OLR

Total field

Anomalies
OLR Time Longitude – Tropical Modes

Ovals are projections of leading modes: MJO (blue), KW (green), ER-1 (black)

Courtesy: Matt Wheeler - CAWCR
Zonal wind shaded, direction by vector
Westerly total/anomalies (red shades)
Easterly total/anomalies (blue shades)

Pentad averages for last 5 days (bottom) and 5 days previous (top)
Zonal wind shaded, direction by vector
Westerly total/anomalies (red shades)
Easterly total/anomalies (blue shades)

Daily averages for last 4 days

CDAS 850 mb Vector Wind Anomalies -- 27NOV2011

CDAS 850 mb Vector Wind Anomalies -- 25NOV2011

CDAS 850 mb Vector Wind Anomalies -- 26NOV2011

CDAS 850 mb Vector Wind Anomalies -- 24NOV2011

NOAA - Climate Prediction Center
Zonal wind shaded, direction by vector
Westerly total/anomalies (red shades)
Easterly total/anomalies (blue shades)

Pentad averages for last 5 days (bottom) and 5 days previous (top)
Sea Surface Temperature

SST (°C) 23 Nov 2011

SST Anomalies (°C) 23 Nov 2011

NOAA - Climate Prediction Center
Velocity Potential

21 NOV 2011

28 NOV 2011
MJO Index

Last 60 Days of Observations: Nov. 28, 2011

Western Pacific

Maritime Continent

Opti
MJO Index Validation

1 Week Ago
Forecasts from: 20111122

2 Weeks Ago
Forecasts from: 20111114
Verification

\( \text{X} \rightarrow \text{Denotes TC development location} \)
Forecast Graphics
MJO index dynamical model forecasts are in good agreement for continued MJO eastward propagation to the MC during the next two weeks. The models vary in amplitude and propagation speed, but are generally consistent with the MJO enhanced phase shifting from Phase 3 to Phase 4 or 5 during the period depending on the model. Statistical forecasts of the MJO envelope also indicate enhanced convection continuing across the eastern IO during Week-1 especially early in the period with convection decreasing across the array as the Week-1 period moves on.

MJO OLR/rainfall composites for Phases 3/4 during Week-1 support enhanced convection from the east-central IO to the MC. Statistical forecasts, from various techniques, also indicate enhanced convection in this region during the Week-1 period. Numerical forecast guidance from the GFS, GEFS, CFS and ECMWF all favor enhanced rainfall during Week-1 across much of the central and eastern IO and parts of the western MC. Tropical cyclone development is also favored for the central IO south of the equator in proximity to the southern portions of the DYNAMO array.

During Week-2, dynamical model MJO index forecasts favor WH MJO index phases 4/5 and corresponding MJO composites support enhanced convection across the MC into the far WPAC with suppressed convection favored for parts of Africa and the western IO to near the DYNAMO array. The two recent cycles of the suppressed phase of the MJO have decreased convection rather quickly across the central IO and so this will need to be closely monitored over the upcoming week. A look ahead to Week-3 favors suppressed convection across the IO.

**Probability of at least moderate strength MJO (Outside WH unit circle with eastward propagation):**

Week-1: 90%, Week-2: 80%, Week-3: 60%
DYNAMO Forecast

Tropical Hazards/Benefits Outlook
Climate Prediction Center

Week 1 - Valid: Nov 30, 2011 - Dec 06, 2011

Week 2 - Valid: Dec 07, 2011 - Dec 13, 2011

Tropical Cyclone Formation
- High: Development of a tropical cyclone that reaches a max. sustained wind of 63 km/hr.
- Moderate: Weekly total rainfall in the upper tercile.
- Below-average rainfall: Weekly total rainfall in the lower tercile.

Symbols:
× DG  + Gan  ○ Ship1  ○ Ship2  Produced: 11/29/2011
OLR/u850 Spatial Forecast Maps – Tropical Modes

Courtesy: Paul Roundy - SUNY

Daily snapshots

a. Summed OLR on 03-Dec-2011
b. Equatorial Rossby OLR Anomaly on 03-Dec-2011
c. MJO OLR Anomaly on 03-Dec-2011
d. 2–10 Day Westward OLR Anomaly on 03-Dec-2011
e. Seasonal to Interannual OLR Anomaly on 03-Dec-2011
f. Kelvin and Extratropical OLR Anomaly on 03-Dec-2011

a. Summed OLR on 10-Dec-2011
b. Equatorial Rossby OLR Anomaly on 10-Dec-2011
c. MJO OLR Anomaly on 10-Dec-2011
d. 2–10 Day Westward OLR Anomaly on 10-Dec-2011
e. Seasonal to Interannual OLR Anomaly on 10-Dec-2011
f. Kelvin and Extratropical OLR Anomaly on 10-Dec-2011
OLR Spatial Forecast Maps – Tropical Modes

Courtesy: Carl Schreck CICS-NC

Madden-Julian Oscillation in OLR

Kelvin Waves in OLR
OLR Spatial Forecast Maps – Tropical Modes

Equatorial Rossby Waves in OLR

Sum of MJO, Kelvin, ER

Courtesy: Carl Schreck CICS-NC
MJO Composites

Courtesy: CPC
ECMWF Forecasts

ECMWF Weekly Average of Ensemble Mean Forecast

Date: 11/28/2011 -- 12/04/2011 (Week 1)
U - V Wind(Vector, m/s), RH(Color, %) at 850hPa

Date: 12/05/2011 -- 12/11/2011 (Week 2)
U - V Wind(Vector, m/s), RH(Color, %) at 850hPa

Date: 11/28/2011 -- 12/04/2011 (Week 1)
U - V Wind(Vector, m/s) at 10m, Precip(Color, mm/day)

Date: 12/05/2011 -- 12/11/2011 (Week 2)
U - V Wind(Vector, m/s) at 10m, Precip(Color, mm/day)
GFS / CFS Forecasts – Week-1

GFS forecast Precip for week 1 from: 20111128all

GFS - CMORPH forecast Precip for week 1 from: 20111128all

16 Member Ensemble Mean Forecast from 28Nov2011

Week 1 Anomalies (mm/day) 28Nov2011–5Dec2011

REVH vs. A-Wind for week 1 from: 20111128all (850hPa)
Ensemble GFS Forecasts – Week-2

GEFS precip for week 2 from: 20111206

GEFS arecip for week 2 from: 20111206

NOAA – Climate Prediction Center
Operational GFS Precipitable Water and 10 m Anomalous Wind

GFS fcst A_PWAT vs. A_Wind 10m for week 1 from: 20111128all

GFS fcst A_PWAT vs. A_Wind 10m for week 2 from: 20111128all

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Comments, Suggestion and Questions?